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March 2, 1999

MARVIN ROSENBERG
202-457-7147

VIA COURIER
Magalie Roman Salas, Esquire
Office of the Secretary
Federal Communications Commission
The Portals
445 Twelfth Street, S.W.
Room TW-A325
Washington, DC 20554

Re: In the Matter of
Amendment of Parts 2 and 25 of the Commission's Rules to Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-Band Frequency Range and Amendment of the Commission's Rules to Authorize Subsidiary Terrestrial Use of the 12.2-12.7 GHz Band by Direct Broadcast Satellite Licensees and Their Affiliates,
ET Docket No. 98-206, RM-9147, RM-9245

Dear Ms. Salas:

Transmitted herewith, on behalf of United States Satellite Broadcasting Company, Inc. ("USSB"), are an original and six copies of its Comments to the above-referenced Notice of Proposed Rulemaking. Also enclosed is a copy of the Comments on diskette.

Should there be any questions, please communicate with the undersigned.

Very truly yours,

Marvin Rosenberg
Counsel for United States Satellite
Broadcasting Company, Inc.

Enclosures

cc: International Transcription Services (diskette copy)

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C.

In the Matter of	)	
	)	
Amendment of Parts 2 and 25 of the	)	
Commission's Rules to Permit Operation	)	
of NGSO FSS Systems Co-Frequency with	)	
GSO and Terrestrial Systems in the	)	ET Docket No. 98-206
Ku-Band Frequency Range	)	RM-9147
and	)	RM-9245
Amendment of the Commission's Rules	)	
to Authorize Subsidiary Terrestrial Use	)	
of the 12.2-12.7 GHz Band by	)	
Direct Broadcast Satellite Licensees	)	
and Their Affiliates	)	

COMMENTS OF
UNITED STATES SATELLITE BROADCASTING COMPANY, INC.

UNITED STATES SATELLITE
BROADCASTING COMPANY, INC.

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Its Counsel

March 2, 1999

Before the
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In the Matter of	)	
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COMMENTS OF
UNITED STATES SATELLITE BROADCASTING COMPANY, INC.

I. INTRODUCTION

United States Satellite Broadcasting Company, Inc., ("USSB"), by its counsel, hereby submits its comments in response to the *Notice of Proposed Rulemaking* ("*Notice*") released by the Commission on November 24, 1998 in the above-captioned proceeding.

USSB is a Direct Broadcast Satellite ("DBS") licensee/permittee providing multichannel video programming by satellite directly to subscribers' homes.[1] Accordingly, USSB has a direct interest in these proceedings.

[1] USSB is a DBS licensee holding five channels at 101° W.L. USSB is a DBS permittee holding three channels at 110° W.L.

In the *Notice*, the Commission seeks comments on a petition filed by Northpoint Technology ("Northpoint")[2] to permit secondary terrestrial use of the 12.2-12.7 GHz frequency band, which is the primary band used by DBS licensees such as USSB.[3] Northpoint claims that its technology permits the reuse of the 12.2-12.7GHz frequency band for the terrestrial retransmission of local television signals and one-way broadband data services by DBS service operators and their affiliates to DBS receivers.

On July 8, 1997, Northpoint Technology, operating under the name Diversified Communication Engineering, Inc. ("DCE"), was granted an experimental license, call sign WA2XMY. The experimental license was obtained to investigate whether broadcast signals could be transmitted and received terrestrially on the same frequencies as direct broadcast satellite signals without causing harmful interference into any DBS receivers. In October 1997, DCE conducted a controlled, low-power test at the King Ranch near Kingsville, Texas. The King Ranch is a remote and very rural area with almost flat terrain.

On July 20, 1998, the Commission granted DCE a modification to the experimental license to continue to test in Kingsville and to perform tests in Austin, Texas. In December 1998, DCE conducted a controlled test in a part of downtown Austin, Texas in order to learn more about the viability of the Northpoint system in an urban environment.

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[2] *See In re* Northpoint Technology Petition for Rule Making to Modify Section 101.147(p) of the Commission's Rules to Authorize Subsidiary Terrestrial Use of the 12.2-12.7 GHz Band by Digital Broadcast Satellite Licensees and Their Affiliates, RM-9245 (Mar. 6, 1998) ("*Petition*"). In the *Petition*, Northpoint requested the Commission to initiate a rule making to modify Section 101.147(p) of the Commission's rules to allow secondary, subsidiary communications authorizations, subject to specific non-interference conditions, for terrestrial use of the 12.2-12.7 GHz frequency band by DBS licensees, third party systems integrators affiliated with DBS systems, and local broadcasters.

[3] The 12.2-12.7 GHz frequency band is allocated to broadcasting-satellite service on a primary basis.

The Commission has a fundamental responsibility to ensure that the spectrum is used effectively and efficiently.[4] Therefore, before the Commission commences to significantly revise its rules to permit secondary terrestrial use of the 12.2-12.7 GHz frequency band, Northpoint must first prove why its service must be provided in the 12.2-12.7GHz frequency band, particularly where Northpoint's service can be provided in frequency bands which are already allocated for high density terrestrial services. Thereafter, Northpoint must prove the feasibility of its technology by conclusively demonstrating that no harmful interference will be caused to existing and future DBS service providers operating in the 12.2-12.7 GHz band.[5]

While USSB is interested in the prospective benefits that may flow from Northpoint's technology, it is incumbent on Northpoint to fully justify its assertions of non-interference and conclusively demonstrate that its proposed use of the 12.2-12.7GHz frequency band will not cause harmful interference to DBS operations in that band. Interference-free operation in the 12.2-12.7 GHz frequency band by the primary service operators is crucial to maintaining and expanding the current base of more than 8.7 million DBS subscribers.[6]

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[4] *See* 47 U.S.C. §§ 151, 303(f) and (g).

[5] In the early 1980's CBS conducted a series of experimental transmissions in the 12.2-12.7 GHz band at Mt. Sutro, San Francisco, California and determined that the band's terrestrial propagation characteristics were unacceptable. While those tests were analog and while digital transmission could be expected to improve the situation, terrestrial operation at this frequency still would not be practicable because Northpoint would have strict power limitations to protect DBS users -- limitations that CBS did not have.

[6] According to the SkyREPORT, DBS providers furnished programming to almost 8.7 million subscribers as of December 1998. This represents an increase of more than 2.4 million subscribers since December 1997, or more than 38%. *See* SkyREPORT, *DTH Subscribers: December 1997-December 1998, available at:* <http://www.skyreport.com/dth_us.htm>.

Any potential sources of interference in that band must be examined extremely closely. To date, the Northpoint technology, as a viable operational system, remains unproven.

As explained below, the results from Northpoint's two experimental trials fail to provide sufficient proof. Perhaps most disturbing, however, is Northpoint's apparent belief that its two experimental trials demonstrate that its technology can operate without causing any harmful interference to existing services. Without additional information, USSB, as well as the Commission, cannot make a determination on the feasibility of Northpoint's technology. The Commission therefore must either deny Northpoint's petition outright and decline to modify the Commission's rules regarding permissible operations in the 12.2-12.7 GHz band, or alternatively, hold Northpoint's petition in abeyance until Northpoint has provided an adequate showing.

II. DISCUSSION

A. Northpoint Has Not Shown Why Its Service Must Be Provided in the 12.2-12.7 GHz Frequency Band.

Northpoint has failed to show why its service must be provided in the 12.2-12.7 GHz frequency band. There is nothing about Northpoint's technology or service offering that requires it to be provided in the 12.2-12.7 GHz frequency band. Northpoint's service can be provided in frequency bands which are already allocated for high density terrestrial services, including spectrum allocated for LMDS service and spectrum in the 38 GHz band.

Northpoint claims that operating in the 12.2-12.7 GHz band would allow its services to be provided with only minimal changes to existing DBS equipment, thus

making its provision less expensive.[7] Northpoint has failed to show how offering its service in the 12.2-12.7 GHz band will require fewer changes to existing DBS equipment or will be significantly less expensive than by using other bands.

Northpoint intends to offer its service to existing DBS subscribers as a complement to DBS service. Under Northpoint's plan, a DBS subscriber would be able to use its existing DBS receiver, but would be required to install an additional terrestrial antenna. Northpoint itself would be required to provide a downconverter notwithstanding the frequency band. Thus, at a minimum, a separate subscriber antenna and downconverter will be required, regardless of the frequency band used. Therefore, Northpoint's claim that it must use the 12.2-12.7 GHz frequency band to provide its service is without merit.

B. Northpoint's Two Experimental Trials Fail to Fully Justify Its Assertions of Non-Interference.

Although Northpoint claims that its two experimental trials demonstrate that Northpoint technology does not cause harmful interference to DBS customers, results from the two experimental trials conducted under FCC experimental licenses in October 1997 and December 1998 do not provide adequate assurance that the Northpoint technology can be deployed effectively without causing interference to existing services.

First, the results from Northpoint's October 1997 experimental trial, which are discussed in the January 8, 1998 Progress Report, clearly show that its terrestrial use of the 12.2-12.7 GHz band did, in fact, cause interference to existing DBS systems

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[7] *See Notice* at para. 93.

located in the region near the Northpoint transmitter, the so-called mitigation zone. Due to the remote and rural nature of the first test site, it was not possible to test for multipath interference that could result from building and other structural reflections that exist in more urban environments. Therefore, results from the first experimental trial do not provide conclusive results from which a reasonable conclusion may be drawn that Northpoint's technology can be deployed without causing harmful interference to existing DBS services. Similarly, the results from Northpoint's December 1998 experimental trial in the Austin, Texas urban area do not conclusively justify its assertions of non-interference.

1. Northpoint's Urban Area Non-Interference Trial Results Are Based On A Surrogate Measure For Signal Error Rate Whose Reliability And Validity Have Not Been Properly Established.

In the December 1998 Progress Report, Northpoint stated that it wanted to assess the degree of DBS interference in the real world by measuring the actual signal error rate. Unfortunately, due to certain constraints, Northpoint was unable to make an actual error rate measurement. Instead, Northpoint relied on the "signal strength pointer," a measurement used for peaking the DBS antenna, to serve as a surrogate measure for actual signal error rate. Use of the signal strength pointer as a surrogate measure for signal error rate was first suggested to Northpoint by USSB personnel.

The signal strength pointer is properly used as a surrogate measure for actual signal error rate only after the equipment to be used for taking the measurements has been carefully and precisely calibrated. The December 1998 Progress Report states only that the "general nature of the relationship" between the signal error rate and the

signal strength pointer was established based on "some related field experiments."

Based on the nature of this statement and due to Northpoint's lack of prior experience with the signal strength pointer measurement, USSB does not know whether the equipment used in the Austin trial for taking the signal strength pointer measurement was properly calibrated to allow it to be used as a statistically reliable surrogate measure for actual signal error rate. Therefore, absent Northpoint providing additional evidence to show that its measurements are reliable and valid, it is imprudent for the Commission to rely on Northpoint's results as the basis for significantly modifying Commission rules.

2. Northpoint Has Not Provided Sufficient Evidence to Show That Its Technology Can Co-Exist with DBS Systems Independent of Atmospheric Conditions.

The December 1998 trial in Austin did not adequately study the power control system necessary to protect DBS transmissions during rain fade conditions. Northpoint claims that its technology can co-exist with DBS systems independent of atmospheric conditions. However, Northpoint does not present information to substantiate this claim.

In the January 1998 Progress Report, Northpoint acknowledged that because significant signal degradation can occur during rain fade conditions, it might be necessary to construct a network of monitoring stations that would allow Northpoint to monitor atmospheric conditions and provide automatic power adjustment to control for rain attenuation. In its petition, Northpoint states that it can adjust its transmitter output power in real time to ensure that a constant carrier-to-noise plus interference

(C/N+I) ratio can be maintained. However, Northpoint does not take into account that different paths in different fade mechanisms exist on satellite paths compared to terrestrial paths. For example, a satellite path may suffer degradation due to a high altitude thunderstorm without rain falling on the receive location.

Rather than studying the impact of rain fade attenuation and devising a plan to ensure that a constant C/N+I ratio can be maintained during rain fade conditions, Northpoint merely states that rain was present during the testing period in Austin and that the rain did not impact the ability to receive a good signal. The most important factor with rain fade is not so much the amount of rain that falls, but the nature of the rain.[8] The larger the raindrops and the more intense the rainfall, the greater the attenuation and the higher the probability of signal outage.[9] Northpoint did not report on the type of rain that was present during the test and accordingly, whether any rain fade attenuation was even expected.

Additionally, the outage time that occurs during rainstorms is also dependent on the elevation angle of the antenna. Lower elevation angles pose problems because of the long path of the beam through the atmosphere.[10] The antenna elevation angle is higher in Texas than most other parts of the United States. Thus, the Austin trial results do not provide sufficient evidence from which to generalize about rain fade conditions that impact the provision of DBS service in other geographic areas.

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[8] JAMES H. GREEN, THE IRWIN HANDBOOK OF TELECOMMUNICATIONS 358 (1997).

[9] *Id.*

[10] ANDREW F. INGLIS AND ARCH C. LUTHER, SATELLITE TECHNOLOGY 81 (1997).

Before Northpoint can definitively state that its technology can co-exist with DBS systems independent of atmospheric conditions, it must prove that it is capable of locally monitoring atmospheric conditions and providing automatic power adjustment to control for rain attenuation. In order to do this, it is incumbent that Northpoint conduct additional trials in other geographic areas in order to determine the type of power control system that is necessary to protect DBS transmissions during rain fade conditions.

3. Northpoint Has Failed to Demonstrate That It Can Provide Interference-Free Service in the Mitigation Zone.

Throughout its petition, Northpoint repeatedly claims that its technology will operate without any harmful interference to existing services. However, this statement contradicts what Northpoint has acknowledged in both its petition and engineering statement—that interference does in fact occur in an area that is near the transmitter, the so-called mitigation zone. The size of the mitigation zone is uncertain; and when utilizing a cellular-type operation, which requires numerous transmitters, the mitigation zones could be a significant factor. Therefore, to the extent that any DBS subscribers are located within the mitigation zone, interference, to those subscribers, will result. Although there may be large unpopulated areas where transmitters can be located, and, therefore, theoretically no interference would result, it would be an imprudent and unreasonable assumption to accept this type of transmitter site location as typical.

Further, in its petition, Northpoint states that the mitigation zone is relatively insensitive to variations in antenna height, and therefore, postulates "use of higher

elevation antennas could decrease the effective exclusion zone, because much of the exclusion zone associated with the transmitter *may* be in the air above roof level". *Petition*, page 16 (*emphasis added*). Beam shaping and beam tilt can be used to mitigate interference at ground level if the transmitting antenna height is well above the antennas being served. Achieving an acceptable antenna height to reduce interference in an urban environment will be difficult because zoning regulations will restrict Northpoint transmitter sites to the same kinds of locations as cellular and PCS services.

In the December 1998 Progress Report, Northpoint states that one of its test objectives in the Austin trial was to examine the nature and extent of the mitigation zone and to consider some effective remedies if required. Although Northpoint did conduct some tests in the mitigation zone in Austin and did not rule out interference problems, Northpoint did not properly test any remedies for interference. Rather, Northpoint merely stated that any interference experienced by DBS subscribers located in the mitigation zone can be "essentially eliminated by simple measures." Due to the known incompatibility between DBS and terrestrial microwave services,[11] Northpoint has an obligation to do more than merely state that interference can be eliminated by simple measures. Therefore, before USSB or the Commission accepts this theory, Northpoint must show, through actual results, that much of the mitigation zone is

[11] *See In re* Inquiry Into the Development of Regulatory Policy in Regard to Direct Broadcast Satellites for the Period Following the 1983 Regional Administrative Radio Conference, *Notice of Proposed Policy Statement and Rulemaking*, 86 F.C.C.2d 719, n.22 (1981).

above roof level and consequently, use of higher elevation antennas can be used to decrease the effective exclusion zone.

4. Northpoint's Urban Area Trial Results Do Not Provide Adequate Information to Determine the Impact of Northpoint's Multipath Interference on DBS Service

Northpoint claims that results from its Austin trials showed that there was no discernible evidence of unacceptable interference from multipath reflections to either the DBS signals or the Northpoint signals. USSB believes that the summary information provided in Northpoint's December 1998 Progress Report is not sufficient to confirm that DBS service is unaffected by multipath reflections from the Northpoint signal. Therefore, the Commission should refuse to proceed further until Northpoint has conducted additional testing and provided more information.

In the December 1998 Progress Report, Northpoint admits that a reflected signal could enter the DBS antenna from an angle within the main beam and cause interference. Northpoint's remedy for this interference is to make small changes to the DBS antenna placement.

Under the Commission's Rules, as the primary service in the 12.2-12.7 GHz frequency band, DBS service is protected against harmful interference by other users.[12] Users in a secondary service are not afforded similar protection. Under normal operating conditions, many DBS antennas have been installed using less than precise measurements, but function properly. USSB believes that Northpoint's potential interference should be evaluated according to its performance under normal

[12] 47 C.F.R. § 2.104(d)(4).

operating conditions. However, under Northpoint's proposed remedy, DBS subscribers would be required to make adjustments to antenna installations that otherwise would not be required in order to accommodate the Northpoint service. USSB believes that DBS subscribers, as users located in a primary service, should not be required to make accommodations for a secondary service.

III. CONCLUSION

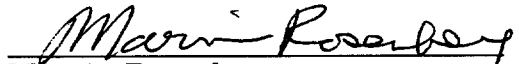
It is imperative for the Commission to gain additional information from Northpoint before it proceeds with a rule making that would significantly change the rules. If Northpoint's technology fails to operate as predicted, vital activity in the 12.2-12.7 GHz band will become subject to interference and disruption. Northpoint bears the burden of proving that will not happen. The information available from the two experimental trials raise significant doubts about the technology's compatibility with DBS systems. The Commission should refuse to proceed further until Northpoint has conducted additional testing and provided more information as discussed above.

The modification that Northpoint seeks is a major change in the Commission's rules. Those rules serve an important purpose. They minimize interference among users of the 12.2-12.7 GHz spectrum. The DBS spectrum allocation serves licensees and permittees who have invested countless dollars in their systems and directly benefits millions of subscribers who have purchased DBS receivers. Many individuals have installed their own dishes since the Commission established DBS with 90° spacing so that small dishes could be used. An applicant that seeks to provide an inconsistent

technology must bear the heavy burden of showing that the change it seeks will not undermine the purpose of the FCC's rules. The applicant must prove, not merely state, that its technology will not cause interference, either to existing users or to users who could have initiated or expanded operations had the rules remained unchanged.

Respectfully submitted,

UNITED STATES SATELLITE BROADCASTING COMPANY, INC.



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March 2, 1999

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Attachment A

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